quantity of food be given, it will probably disturb the system and give inaccurate results. It is necessary to give a moderate dose, and in the customary form. The effect of all agents is temporary, and that of all kinds of food begins quickly and attains its maximum within 1 to $2\frac{1}{2}$ hours. If the maximum effect only be sought for, that period will suffice for the inquiry; but if the average or total influence be desired, it will be necessary to continue the inquiry until the whole period of increase and decrease, or *vice versâ*, have passed over. In either case the experiments must be made every few minutes, and be regularly repeated. The maximum quantities are easily attainable, but the true average or the total effect is scarcely if at all so, since it is difficult or impossible to ascertain the precise period of the termination of the effect. Hence only one dose of the food can be given on the same day, when great accuracy is desired. A second period may be found at about $4\frac{1}{2}$ hours after the breakfast; but, although it is next in value to the period before breakfast, it cannot be implicitly relied upon, since no proof could be obtained that the vital functions had subsided from the breakfast increase to their lowest point before the inquiry began. All such experiments must be tested by morning inquiries. Whenever there is a sense of craving for food, or any disturbed feeling, it is highly probable that the vital actions are varying, apart from the influence of the food, and the inquiry should be terminated. The addition of water to the food does not vary the results connected with the respiration, except so far as it may enable the food to enter the circulation quickly. If the solution of the food have been imperfect, the subsequent ingestion of water alone will cause an increase in the effect equal to that of taking more food.

II. "On the Motions of Camphor on the Surface of Water." By Charles Tomlinson, Esq., Lecturer on Science, King's College School, London. Communicated by Dr. William Allen Miller, Treasurer and V.P.R.S. Received January 15, 1862.

(Abstract.)

The object of this paper is to show that the phenomenon in question is a much more general one than is commonly supposed; that

the explanations hitherto given of it have been insufficient or erroneous. The author endeavours to explain the real nature of the phenomenon in a series of experiments and observations, and to establish the following propositions:—

I. That the camphors, or stearoptens of the volatile oils, present phenomena of rotation and progression when thrown on the surface of clean water in a chemically clean vessel.

II. That these phenomena belong also to certain salts, and to a variety of vegetable and other substances containing a liquid that diffuses readily over the surface of water.

III. That solutions of camphor in benzole, in some of the essential oils, &c., present phenomena of rotation and progression on the surface of water—a property which also belongs to creosote, and to some other liquids that do not contain camphor.

IV. That the motions of camphor may be imitated by placing on water miniature rafts or coracles of inert substances, such as talc, tinfoil, paper, &c., smeared with or containing the elæoptens of volatile oils, or indeed any volatile liquid, such as ether, alcohol, chloroform, &c., provided there be some communication and adhesion between such liquid and the surface of the water.

V. That the camphors, &c., being slightly soluble in water, that is, the adhesion of the water partly overcoming the cohesion of the camphor, a film of camphor is thus detached from it, and spread over the surface of the water the moment that the camphor comes in contact therewith.

VI. That the dimensions and form of this film depend on those of the piece of camphor operated on; and, in general, the film separates more easily from broken surfaces and angles of the fragment than from a smooth natural surface, just as the crushed or broken surface of a crystal is more soluble than a perfect crystal.

VII. That such films being constantly detached from the camphor so long as it is in contact with the water, displace each other; the preceding film being conveyed away by the adhesion of the water in radial lines, these produce motion, by reaction on the fragment, causing it to rotate after the manner of a Barker's mill.

VIII. That these radial lines or jets being of unequal intensity, the direction and intensity of the motion will follow that of their resultant.

IX. That the jets or films of camphor can be rendered sensible by various means—as by fixing the camphor partly submerged in water, and dusting the surface lightly with lycopodium powder: a series of horizontal currents produced by the films will then be made visible, which films or jets cause the camphor, when free to move, to rotate on a vertical axis.

X. That the motions of the fragments of camphor on water are greatly influenced and complicated by their mutual attraction and by the attraction of the sides of the vessel.

XI. That the film of camphor diffused over the surface of the water is very volatile, disappearing as fast as it is formed, chiefly into the air, only a very small portion being retained by the water. Hence camphor wastes away much more quickly at the surface of the water than in water alone or in air alone, because at the surface the film is being constantly formed at the expense of the camphor, and is spread out to the united action of air and water.

XII. That whatever interferes with evaporation lowers or arrests the motions of the camphor and the allied phenomena; so, on the contrary, whatever promotes evaporation exalts these phenomena. Effects which are displayed with great energy on a bright and sunny day, are produced either sluggishly or not at all on a wet, dull, or foggy one.

XIII. That a fixed oil forming a film on water will displace the camphor film, and so permanently arrest the motions of the camphor; but a volatile oil will only arrest the motions while it is present and undergoing evaporation.

XIV. That the presence of the camphor film on water will, in some cases, prevent the formation of other films, the liquids that would otherwise form them remaining lenticular.

XV. That the camphor film, and other films, in many cases repel each other on the surface of water.

XVI. That the motions of camphor on the surface of water are accelerated by the action of the vapour of benzole, and some other volatile substances: such vapours, condensing in the liquid form on the camphor, and then being diffused by the adhesion of the water, react on the camphor.